

CLAIMS

1. Shutter device designed to close off a bay (6) or other opening co-operating with driving means enabling the shutter (1) to be displaced between an open position and a closed position and comprising a drum (8) about which the shutter (1) is wound into its open position forming a roll (31) made up of turns formed by the successive layers of the shutter (1), and from which the shutter (1) can be unwound into its closed position, **characterised in that** confining means (11) are provided to prevent the turns from forming wrinkles as the shutter (1) is displaced into its closed position and/or to prevent these turns from slipping relative to one another.

2. Device as claimed in claim 1, characterised in that the confining means comprise hooking means (11) extending along the length of the shutter (1) on at least one of the faces thereof, which fix the successive turns relative to one another in order to prevent the successive turns of the shutter (1) from slipping relative to one another.

3. Device as claimed in claim 2, characterised in that the hooking means (11) consist of a strip extending on one of the faces of the shutter (1) in the direction of its length and having at least one projection (12, 16, 21, 22, 23, 26, 27) which co-operates with the matching part on the other face of the shutter (1) such that said projection (12, 16, 21, 22, 23, 26, 27) grips with this part as the shutter (1) is being wound around the drum (8).

4. Device as claimed in claim 3, characterised in that said strip has at least one projection (12, 16, 21, 22, 23, 26, 27) extending on one of the faces of the shutter (1) which is provided with one or more teeth (29) capable of engaging in a matching recess (13, 17, 18, 24, 25, 28) provided on the other face of the shutter (1) as the latter is being wound around the drum (8).

5. Device as claimed in any one of claims 2 to 4, characterised in that the hooking means (11) consist of a ribbon (14) provided with hooks extending on either side of the plane of the shutter (1) so that the hooks on one side of the shutter (1) are able to grip onto hooks on the other side of the shutter (1) as the latter is wound.

6. Device as claimed in any one of claims 2 to 5, characterised in that the hooking means (11) consist of a notched belt (15) extending along the shutter (1), one of the sides of which is provided with a succession of teeth (16) and the other side of which has matching notches (17) which

are such that, as the shutter (1) is being wound, the teeth (16) engage with the notches (17), preventing the successive layers of the shutter (1) thus formed in the roll (31) from slipping relative to one another.

7. Device as claimed in claim 6, characterised in that the distance between said teeth (16) and/or the dimensions thereof vary along the length of the shutter (1) in order to make allowance for the thickness of the shutter (1) and/or the increase in the diameter of the successive turns formed as the shutter (1) is wound.

8. Device as claimed in any one of claims 2 to 7, characterised in that at least one pressing element is provided, which enables a thrust force to be applied to the hooking means (11) substantially radially to the drum (8) in order to fix the successive turns of the roll (31) one to the other.

9. Device as claimed in claim 8, characterised in that the pressing element and the drum (8) are mounted so as to be move relative to one another, means being provided to maintain a pressing force between the roll (31) and this pressing element.

10. Device as claimed in claim 8 or 9, characterised in that the pressing element has a rotating cylinder (30), the axis of which is substantially parallel with the axis of the drum (8).

11. Device as claimed in any one of claims 1 to 10, characterised in that the confining means consist of a belt (36, 40) at least partially enclosing said roll (31), this belt (36, 40) exerting a pressing force on the roll (31), means being provided to adapt the shape of this belt (36, 40) to the diameter of the roll (31) as the shutter (1) is wound or unwound.

12. Device as claimed in claim 11, characterised in that said belt (36) defines a guide surface bearing on the roll (31) and enabling the roll (31) to move relative to the belt (36).

13. Device as claimed in claim 12, characterised in that said guide surface is provided in the form of a succession of rollers (37) fixed to the belt (36) and bearing on the outermost turn of the roll (31), these rollers rotating, preferably each about an axis parallel with that of the drum (8).

14. Device as claimed in any one of claims 11 to 13, characterised in that means (47) are provided to exert a traction force on one of the ends of the belt (36) so that at least a part of the latter extends along the contour of the roll (31) exerting a pressing force thereon as the shutter (1) is wound or unwound.

15. Device as claimed in any one of claims 11 to 13, characterised in that said belt (40) loops back on itself and is guided on cylinders (41) extending substantially parallel with the axis of the drum (8), said roll (31) being at least partially enclosed by the belt (40) which is in contact with the outermost turn of the roll (31) applying a pressing force thereto.

16. Device as claimed in claim 15, characterised in that at least one of said cylinders (41) is mounted so as to move relative to the drum (8) in order to adapt the shape of the belt (40) to the diameter of the roll (31) as the shutter (1) is being wound or unwound.

17. Device as claimed in claim 15 or 16, characterised in that said belt (40) is made from an elastic material.

18. Device as claimed in any one of claims 1 to 17, characterised in that the shutter (1) cooperates with an incompressible oblong component cooperating directly or indirectly with the driving means of the shutter and extending along the side edge of the latter in the longitudinal direction of the shutter, this component, as the shutter is the closed, acting on a projecting part provided at this side edge.

19. Device as claimed in claim 18, characterised in that the incompressible component is wound around the drum when the shutter is in its open position forming superposed turns, the incompressible component being provided with hooking means to fix the successive turns one to the other such that a thrust force is applied on the incompressible component along its longitudinal direction as the shutter is unwound by driving the drum. 20. Device as claimed in claim 18 or 19, characterised in that said projecting part is provided at the lower end of the shutter.

21. Device as claimed in any one of claims 18 to 20, characterised in that a guide track is provided relative to which the incompressible component is displaced as the shutter is opened or closed.

22. Device as claimed in claim 21, characterised in that the incompressible component and the corresponding side edge of the shutter are guided in said guide track, so that, when a force is

exerted on the shutter in a direction transversally to the guide track, the side edge of the shutter is released from the corresponding side edge and from the corresponding incompressible component.

23. Device as claimed in any one of claims 18 to 22, characterised in that the shutter has a thickening extending along the length of the shutter, the thickness of which in a direction perpendicular to the plane of the shutter essentially corresponds to the thickness of the incompressible component in that direction.